



## Unité Mixte de Physique CNRS/Thales

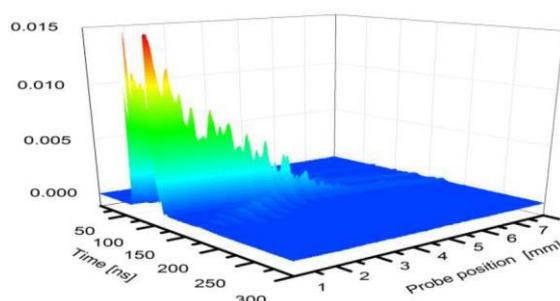
Séminaire le mercredi 12/07/2017 à 11h00, salle 1B2-106

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## Excitation and propagation of spin wave pulses in a magnonic crystal

Magnonic crystals (MCs) have recently demonstrated an outstanding capability to connect fundamental physics with applications at microwave frequencies [1]. Their characteristics have inspired multiple studies where detailed results on the behavior of the frequency-amplitude characteristic as a function of different structural parameters have been demonstrated [2]. However, up to now, all the scientific reports deal exclusively with the resulting spin wave spectrum for the complete MC structure and little has been said about the behavior of the spin wave inside the magnonic crystal. Here, we present a detailed study of the propagation of surface spin waves (MSSW) through a MC, the influence of the pulsed spin wave excitation in the formation and the evolution of frequency bandgaps inside the MC, and the spatial energy distribution as a function of frequency and position. A time and space resolved magneto inductive probing system has been used to map the spin wave propagation in a geometrically structured yttrium iron garnet (YIG) film. The results show that the formation of the bandgaps in the transmitted spin wave spectrum depends not only on the MC structure but also on the duration of the propagating pulse.



Spin wave pulse trace in a magnonic crystal

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- [1] K. W. Reed, J. M. Owens, and R. L. Carter, *Circuits Syst. Signal Process.* **4**, 157 (1985)
- [2] A. V. Chumak, A. A. Serga, S. Wolff, B. Hillebrands, and M. P. Kostylev, *J. Appl. Phys.* **105**, 083906 (2009)

### WARNING NOTE:

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